REMARKS

Disposition of Claims

Upon entry of the foregoing amendments, claims 1-2, 4-9, and 11-15 will remain pending in the application and stand ready for further action on the merits. Claim 1 has been amended herein to recite a polymeric web material and to further clarify that the beam cuts completely through the web so as to produce a cut-out article having a surface substantially free of flashing. Claim 8 has been amended to further clarify that the camera optical system directs the laser beam along the shaped article during the cutting process. These amendments are fully supported by the specification particularly at Paragraphs 22 and 25-30, and the originally filed claims. No new matter has been added to the application. Claims 4-5 have been amended so that they now are dependent on claim 2, and claims 11-12 have been amended so that they now are dependent on claim 9. Claims 3 and 10 have been canceled without prejudice or disclaimer of the subject matter contained therein.

Rejections Under 35 U.S.C. §102

The Office Action first states that claims 1-4 and 6-7 are rejected under 35 U.S.C.§102(b) as being anticipated by Duley et al., U.S. Patent 4,933,205 ("Duley"). In reply, Applicant submits that Duley does not anticipate the present invention, as recited in amended claims 1-4 and 6-7 for the reasons discussed below.

Applicant agrees with the Examiner that Duley discloses a method of forming a relief image on a foam plastic substrate using laser irradiation. The method involves applying a dry transfer ink composition to the surface of the foam substrate. The ink composition is applied to the substrate in the desired shape of the relief image to be formed. As the Examiner points out, Duley discloses that the composition may be applied to the substrate in the pattern of an o-ring seal or gasket. Then, the image of the composition is formed in relief on the substrate by irradiating the substrate with a laser beam. The sections of the substrate that are not coated with the composition are ablated at a faster rate than the sections that are coated. The resulting product is a foam substrate containing raised images of the desired articles as shown, for example, in FIG. 6b.

However, Duley does not disclose a process for laser-cutting a polymeric web material, wherein the beam cuts completely through the web to produce a cut-out article as recited in amended claim 1. This precise laser-cutting step produces a cut article that is separated from the web. In contrast to the teachings in Duley, the final product is not a piece of foam having a relief image of the article on its surface; rather, the actual article is generated. In Applicant's process, the article is cut-out precisely and removed from the web. The cleanly cut article is characterized by having a surface substantially free of "flashing." As described at Paragraph 15 in the specification, flashing refers to excess, fringe material such as burrs or ridges. Thus, Applicant's process produces precision-cut parts that can be used in various applications. No further de-flashing, de-burring, or other machine-tooling is required to smooth-out the edges of the article.

It is submitted that Duley does not disclose each and every element of amended claim 1 as required by an anticipatory reference. Claim 2 has been canceled, and claims 3-4 and 6-7 are ultimately dependent on amended claim 1. Accordingly, it is respectfully requested that the rejections of claims 1-4 and 6-7 (as amended) under 35 U.S.C. §102(b) be withdrawn.

Rejections Under 35 U.S.C. §103

The Office Action next states that claims 8-11 and 13-15 are rejected under 35 U.S.C.§103(a) as being unpatentable over Duley in view of Duffin, U.S. Patent 6,201,214 ("Duffin"). Applicant submits that the combination of Duley and Duffin does not render the present invention, as recited in amended claims 8-11 and 13-15, prima facie obvious.

Applicant agrees with the Examiner that Duffin discloses a method of drilling holes through a workpiece using a laser with an in-line camera system. The camera uses auto-focusing techniques to move the laser nozzle until perfect focus over the workpiece has been achieved. A hole in the workpiece is then drilled. According to Duffin, after each hole has been drilled, the same optical camera provides digital data to a controlling processor so that an assessment of the drilled hole can be made. The Examiner takes the position that it would have been obvious to a person of ordinary skill in the art to modify

the laser-etching process in Duley by using an in-line camera system as described in Duffin.

However, Applicant submits that a person of ordinary skill in the art would have no reason to combine the teachings of Duley and Duffin based on the disclosures therein. Neither Duley nor Duffin provides any suggestions for combining these references. As discussed above, Duley teaches a process of forming a relief image on a foam substrate, but Duley is not interested in the precision laser-cutting of articles from a polymeric web. In fact, Duley teaches that accurate control of the laser is not even necessary in his process:

> It will be noted that the above technique does not require the accurate control of the laser or the movement of the substrate to produce the image and permits the composition to be deposited on the surface 24 in a simple and readily available manner.
> (col. 2, lines 66-68 and col. 3, lines 1-2).
>
> In each case it will be noted that to reproduce accurately the desired shape, close control of movement of the beam as it travels across the surface is not required to produce the desired shape on the substrate.
> (col. 5, lines 6-9).

In view of the teachings in Duley, a person of ordinary skill in the art would have no basis for modifying the laser-etching process disclosed therein so that an in-line camera system is used in that process. Duley has no need for such an optical system and teaches that accurate control of the laser is not even required. Thus, a person could only modify the disclosure in Duley and combine these references by ignoring the central teachings in Duley. It is respectfully submitted that such a construction is not permissible to render a claim obvious.

Not withstanding the foregoing, it is submitted even if the teachings in Duley and Duffin were combined, the present invention still would not be obvious to a person of ordinary skill in the art, because of the different camera systems. Duffin teaches using a camera system to provide accurate spacing between the laser nozzle and workpiece prior to drilling and to provide feedback on the drilled holes:

> Parameters such as diameter and circularity of the hole can be monitored, and optionally by using "best fit" digital processing techniques the characteristics of the drilled hole can be compared with those of an optimum desired drilled hole. (col. 3, lines 3-7).

Thus, the camera system in Duffin controls the position of the laser nozzle relative to the workpiece to compensate for errors produced in previously drilled holes. (col. 1, lines 62-65).

In sharp contrast, Applicant's process uses a camera system to locate the shaped pattern *and* to guide a laser beam along the pattern during the cutting step. The camera provides continuous feedback as to the shape of the article, while the laser beam cuts through the polymeric web. In turn, the camera instructs the laser to adjust its cutting position as needed. This dynamic laser-cutting process is important in the cutting of shaped articles from polymeric webs. The shapes of articles on elastomeric and other relatively soft polymeric webs may change due to heat generated by the laser. The heat forces the polymer to expand and/or retract, depending upon the geometry of the article. These shape variations in the polymer and resulting article are not acceptable when making precision parts. Thus, Applicant uses the camera system of the present invention as an "eye" for guiding the laser's cutting path and compensating for any shape variations in the polymer.

Thus, even if a person of ordinary skill in the art looked to Duffin and combined the teachings therein with the teachings in Duley, the present invention would not be obvious. Duffin does not disclose or suggest employing a camera system to locate the shaped pattern on the web *and* to guide a laser beam while it cuts completely through the web and produces a cut-out article having a surface substantially free of flashing as recited in amended claim 8. As the Examiner recognizes, claims 9, 11 and 13-15 are dependent ultimately upon amended claim 8. Claim 10 has been canceled.

Lastly, the Office Action states that claim 12 is rejected under 35 U.S.C.§103(a) as being unpatentable over Duley in view of Duffin and further in view of Narayan et al., U.S. Patent 6,559,196 ("Narayan"); and claim 5 is rejected under 35 U.S.C.§103(a) as being unpatentable over Duley in view of Narayan. As discussed above, Applicant believes that amended claims 8 and 1 are in condition for allowance. Claim 12 is

ultimately dependent upon amended claim 8; and claim 5 is ultimately dependent upon claim 1; thus, it is submitted that these claims are also in condition for allowance.

Further addressing the Examiner's citation of the Narayan reference, Narayan discloses polyurethane compositions made from low-VOC polyisocyanate and low-VOC hydrogen-containing components. These compositions can be poured into molds to form fire-resistant, non-precision parts. The composition reacts to form a foam product. However, there is no disclosure or suggestion in Narayan for a precision laser-cutting process as defined in the present invention.

Conclusion

In summary, Applicant submits that claims 1-15 (as amended) are patentable and each of the Examiner's rejections and objections has been overcome. Accordingly, Applicant respectfully requests favorable consideration and allowance of amended claims 1-15.

The Commissioner is hereby authorized to charge any additional fee required in connection with the filing of this paper or credit any overpayment to Deposit Account 02-0900. Should there be any outstanding matter that needs to be resolved in the present application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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